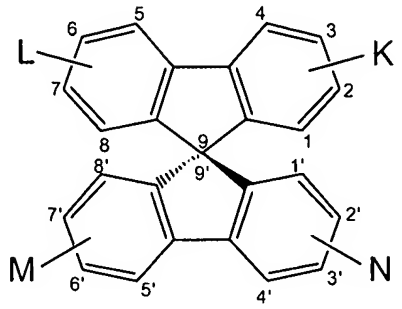
CLAIMS

1. Spirobifluorene derivatives and corresponding radical anions having the following general formula (II):



(II)

in which K, L, M and N, the same or different from each other, are independently: H or A-C=O, with the proviso that it is never K = L = M = N = H, wherein A is an aromatic group bearing at least one radical R, with R = H or aliphatic group.

2. Spirobifluorene derivatives and corresponding radical anions according to claim 1 wherein A is selected among: aromatic groups, aromatic groups containing heteroatoms, condensed aromatic groups, condensed aromatic groups containing heteroatoms, and corresponding derivatives.

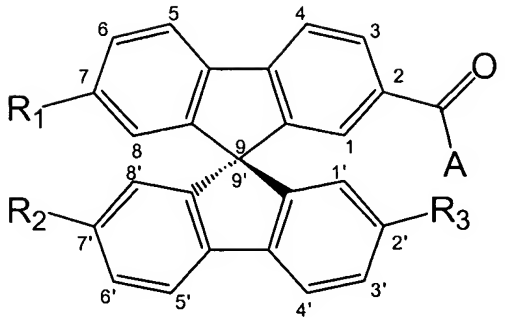
3.Spirobifluorene derivatives and corresponding radical anions according to claim 1 wherein A is selected in the group of the following derivatives: phenyl, biphenyl, 1-naphthyl, 2-naphthyl, 2-thienyl, 2-furyl, 2-pyrrolyl, 3-thienyl, 3-furyl, 3-pyrrolyl, 9-anthryl, biphenylenyl, perylenyl, fullerenyl, and corresponding derivatives.

4.Spirobifluorene derivatives and corresponding radical anions according to claim 1 wherein R = linear, branched or cyclic aliphatic C_1-C_n, with n positive integer ≥0, preferably C_1-C_{18}, more preferably C_1-C_6.

5. Spirobifluorene derivatives and corresponding radical anions according to claim 1 wherein A is substituted with at least one R' group where R' is selected in the group of: halogens, trifluoromethyl, hydroxyl, -SH, -SC[C_{1-6}(alkyl)], alkoxy, nitro, cyano, -COOH, -COOC[C_{1-4}(alkyl)], -NH_2, -NC[C_{1-4}(alkyl)]$_2$, benzyl, benzoyl.

6. Spirobifluorene derivatives having the general formula (III) and corresponding

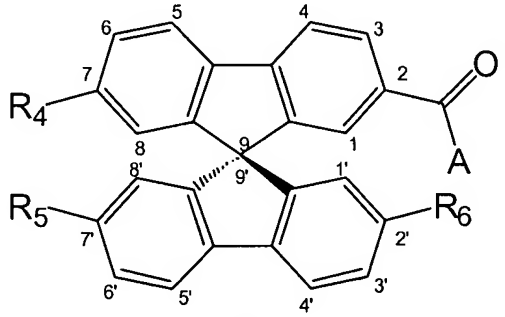
radical anions:



(III)

wherein A is an aromatic group and $R_1 = R_2 = R_3 = H$; or $R_1 = R_3 = H$ and $R_2 = C_{1\text{-}6}$(alkyl); or $R_1 = R_2 = H$ and $R_3 = C_{1\text{-}6}$(alkyl); or $R_2 = H$ and $R_1 = R_3 = C_{1\text{-}6}$(alkyl).

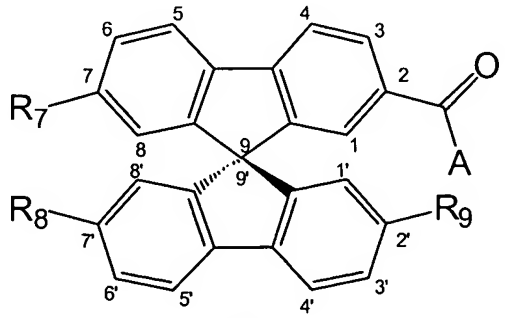
7. Spirobifluorene derivatives having the general formula (IV) and corresponding radical anions:



(IV)

wherein R_5 = A-C=O with A = aromatic group and $R_4 = R_6 = H$; or R_5 = A-C=O and $R_4 = R_6 = C_{1\text{-}4}$(alkyl); or R_6 = A-C=O and $R_4 = R_5 = H$; or R_6 = A-C=O and $R_4 = R_5 = C_{1\text{-}4}$(alkyl).

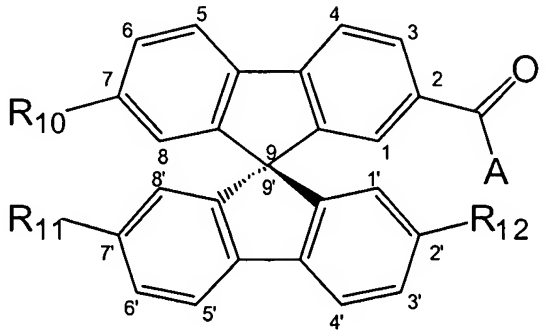
8. Spirobifluorene derivatives having the general formula (V) and corresponding radical anions:



(V)

wherein $R_7 = R_9 = A\text{-}C{=}O$ with A = aromatic group and $R_8 = H$; or $R_7 = R_9 = A\text{-}C{=}O$ and $R_8 = C_{1\text{-}4}$(alkyl).

9. Spirobifluorene derivatives having the general formula (VI) and corresponding radical anions;



(VI)

wherein $R_{10} = R_{11} = R_{12} = A\text{-}C{=}O$ with A = aromatic group.

10. Spirobifluorene derivatives and corresponding radical anions according to claims 6-9 wherein A is selected among: aromatic groups, aromatic groups containing heteroatoms, condensed aromatic groups, condensed aromatic groups containing heteroatoms, and corresponding derivatives.

11. Spirobifluorene derivatives and corresponding radical anions according to claims 6-9 wherein A is selected in the group of: phenyl, biphenyl, 1-naphthyl, 2-naphthyl, 2-thienyl, 2-furyl, 2-pyrrolyl, 3-thienyl, 3-furyl, 3-pyrrolyl, 9-anthryl, biphenylenyl, perylenyl, fullerenyl, and corresponding derivatives.

12. Spirobifluorene derivatives and corresponding radical anions according to claim 1 wherein L = M = N = H and K = A-C=O in position 2, with A = phenyl and R = H.

13. Spirobifluorene derivatives and corresponding radical anions according to claim 1 wherein L = N = H, K and M in position 2 and 2' are A-C=O, with A = phenyl and R = H.

14. Spirobifluorene derivatives and corresponding radical anions according to claim 1 wherein L = N = H, K and M in position 2 and 7' are A-C=O, with A = phenyl and R = H.

15. Spirobifluorene derivatives and corresponding radical anions according to claim 1 wherein L = M = N = H, K in position 2 is A-C=O with A = phenyl and R = p-tert-Bu.

16. Spirobifluorene derivatives and corresponding anionic radicals according to claim 1 wherein is: L = N = H, K and M in position 2 and 2' are A-C=O, with A = phenyl and R = p-tert-Bu.

17. Spirobifluorene derivatives and corresponding radical anions according to claim 1 wherein is: L = M = H, K and N in position 2 and 7' are A-C=O, with A = phenyl and R = p-tert-Bu.

18. Spirobifluorene derivatives and corresponding radical anions according to claims 1-17 in a mixture of them as enantiomers.

19. Spirobifluorene derivatives and corresponding radical anions according to claims 1-17 in optically pure form.

20. Method for preparing the Spirobifluorene derivatives according to claim 1 comprising the following steps: use the non-functionalised SBF as the starting product (formula (I)) and add to it the compound A-C=OCl with A = aromatic group, in the presence of a Lewis acid, preferably selected among $AlCl_3$, $AlBr_3$, $FeCl_3$, particularly preferably $AlCl_3$, in a solvent preferably selected between CH_2Cl_2 and CS_2, particularly preferably CH_2Cl_2, at a reaction temperature from 10 °C to reflux.

21. Method for preparing the Spirobifluorene derivatives according to claim 1 comprising the use, as intermediate, of SBF functionalised as acid chloride $SBF(COCl)_x$, with x positive integer ≥1 and equal to the number of substituents to be obtained on the SBF; said acid chloride is then combined with A-H, in which A = aromatic group, said acid chloride intermediate being prepared from the corresponding carboxylic acids of the SBF, $SBF(COOH)_x$, in turn obtained from the corresponding acetyl derivatives $SBF(COCH_3)_x$, x having in both cases the above-mentioned meaning.

22. 9,9'-Spirobi[9H-fluorene]-2,-carbonyl chloride.

23. 9,9'-Spirobi[9H-fluorene]-2,2',7-tricarbonyl trichloride.

24. 9,9'-Spirobi[9H-fluorene]-2,2',7-7'-tetracarbonyl tetrachloride.

25. Electrochemical method for preparing the radical anions corresponding to the derivatives of the SBF according to claims 1-24, said method being characterised in that said derivatives, to be transformed into radical anions, at a concentration between 0.1 M and 0.1 mM, preferably between 0.01 M and 0.5

mM, particularly preferably approximately 1 mM, are added to an anhydrous aprotic solvent containing a supporting electrolyte, also anhydrous, in order to obtain a concentration of the latter of between 1 M and 0.01 M, preferably 0.2 M and 0.05 M, particularly preferably approximately 0.1 M, the mixture then being placed in an electrolysis cell and a d.d.p. applied between the electrodes in order to obtain the required radical anion.

26. Electronic devices, in particular systems for electroluminescence, molecular-based computational systems, OLEDs, molecular switching components, components for non-linear optics, molecular-based computational systems, field-effect transistors, semiconductors with negative differential resistance, said systems comprising elements provided on their surface with at least one layer of a film or coating comprising at least one of the compounds according to claims 1-24.

27. Use of the compounds according to claims 1-24 in components for molecular electronics, in particular systems for electroluminescence, molecular-based computational systems, OLEDs, molecular switching components, components for non-linear optics, molecular-based computational systems, field-effect transistors and semiconductors with negative differential resistance.